



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/678,504 | 10/03/2003 | Toshiro Okamura | 17074 | 1974 |
| 23389 7590 09/02/2008 SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530 | | | | |
| EXAMINER | | | | |
| BRUTUS, JOEL F | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 3768 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 09/02/2008 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/678,504

Applicant(s)

OKAMURA ET AL.

Examiner

JOEL F. BRUTUS

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2003.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-27 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-856)
Paper No(s)/Mail Date 10/03/2003 and 04/07/2003
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-9, 11-14, 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) in view of Chopp et al (US Pat: 5,305,751) and further in view of Barnes (US Pat: 4,843,504).

Regarding claims 1-5, 7-9, 11-14, 20-26, Tanaka et al teaches SQUID magnetometer to detect sentinel lymph nodes [see page 665] two coils mounted above the SQUID sensor [see page 666 and fig 2], measuring magnetic field associated with the fluid [see page 666 and bottom of fig 3], a sinusoidal AC current, a lock amplifier that consists of a phase sensitive detector, a low pass filter and a phase shifter [see page 666]. Tanaka et al further teaches demodulating signals by the lock in amplifier [see page 666].

Tanaka et al doesn't a plurality of magnetic sensors and an electromagnet and a magnet and the combination of a magnet.

However, Chopp et al teaches a method of measuring liquid flow in a living organism by applying magnetic field. The measurement of the induced magnetic field is accomplished using at least two magnetic sensors [see column 2 lines 20-35] and SQUID detector [see abstract]. Chopp et al further teaches a magnet and an electromagnet [see column 3 lines 3-7], a biomagnetometer that has a plurality of magnetic sensors [see column 4 lines 9-13]. Chopp also teaches the magnet, sensors and Squid are placed in a magnetically shielded room [see column 5 lines 1-7] and the sensors and SQUID are inside in an insulated enclosure [see column 4 lines 35-55].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the Tanaka et al reference by using the teachings of Chopp et al; to obtain higher resolution, provide accurate images having a good signal to noise ratio. One with ordinary skill in the art at the time the invention was made would be motivated to use magnetic sensors for the very low noise advantage. The phase shifter of Tanaka et al can be used as a variable offset to regulate signal acquisition.

Both Tanaka et al and Chopp et al are silent with two U-shaped magnets in parallel in the same direction of polarity and surround the magnetic sensors, rotating or vibrating the combination magnet and sensors and preamplifier, driving circuit, actuator, ferrite core, thin film. The plurality of magnets is disposed symmetrically and the magnetic sensors and the preamplifier is vibrated or rotated in direction of a plane or a line.

However, Barnes et al teaches U shaped or horseshoe magnets and electromagnets [see column 1 lines 30-35] and fig (8); a preamplifier [see column 8 lines 15-16, an actuator coil [see column 2 lines 64-66], a magnetic shielding means [see column 9 lines 19-23], electromagnet and magnet are oriented in direction of movement [see column 8 lines 52-54] and fig (8), thin film [see column 5 lines 41-43], a differential amplifier [see column 7 lines 35-37], ferrite core [see column 5 lines 6-8], drive circuitry [see column 8 lines 10-12 and column 4 line 37], rotary drive [column 2 lines 65-66].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the Tanaka et al and Chopp et al references by using the teachings of Barnes; to have a more compact configuration that would pick up stronger signal, therefore increasing resolution with a higher SNR by minimizing artifacts. U shaped magnets to conserve magnetic flux emanating therefrom. One would be motivated to use thin film technologies for reducing the cost. The rationale for this is that thin-film modules are expected to be cheaper to manufacture owing to their reduced material costs, energy costs, handling costs and capital costs; and using ferrite because of low cost and relatively high output. One with ordinary skill in the art would be motivated to use the magnets symmetrically to strengthen signal processing.

3. Claims 6, 10, 17, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11,

No. 1, P. 665-668, March 2001) in view of Chopp et al (US Pat: 5,305,751) and further in view of Barnes (US Pat: 4,843,504) as applied to claims 1 and 2 above, and further in view of Yarnall et al (US Pat: 6,331,703).

Regarding claims 6, 10, 17, 18 and 19, all limitations of the parent claims are taught in paragraph [2] above. Barnes further teaches a shielding means [see column 9 lines 19-23].

But these teachings are silent to an airtight and watertight probe or configuration and a magnetic shielded preamplifier and driver circuit.

However, Yarnall et al teaches a targeting probe made of non magnetic material that has housing with a preamplifier [see column 6 lines 30-52 and fig (7)]. Yarnall et al further teaches that the probe is sealed [see column 6 lines 47-50] and airtight [see column 6 lines 47-50].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use the Yarnall et al teachings for the purpose of preventing body fluid from contacting inside the probe and to avoid damaging electronic circuitry while producing high magnetic field levels. One with ordinary skill in the art would motivate to magnetically shield the preamplifier and the driver circuit to cancel out some of the excess magnetic field.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node

Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) in view of Chopp et al (US Pat: 5,305,751) and further in view of Barnes (US Pat: 4,843,504) as applied to claims 1, 2, 4 and 8 above, and further in view of Kryder et al (US Pat: 4,800,457).

Regarding claims 15 and 16, all limitations of the parent claims are taught above in paragraph [2].

These teachings are silent to neither magnetic impedance (MI) sensor nor magnetic resistance (MR) sensor.

However, Kryder et al teaches magnetic resistance sensor [see column 5 lines 57-59].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use magnetic resistance sensor for the purpose of regulating the level of magnetization.

5. Claims 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) in view of Chopp et al (US Pat: 5,305,751) and further in view of Barnes (US Pat: 4,843,504). as applied to claims 1, 2, 24, 23 and 21 above, and further in view of Nakamura et al (US Pat: 5,559,340).

The teachings set forth above by Tanaka et al and Barnes are silent to the CDS photocoupler.

However, Nakamura et al teaches CDS photocoupler [see column 1 lines 60-62].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use CDS photocoupler; for the purpose of transmitting signal optically between two circuits.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Casler Brian can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3768

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian L Casler/
Supervisory Patent Examiner, Art
Unit 3737

/J. F. B./
Examiner, Art Unit 3768